

CLAIMS

What is claimed is:

1. A network element in an optical communications network, the network element comprising:

a data collection application program interface (API) for receiving a request from a client for network topology information;

a topology gatherer module in communication with said data collection API;

a topology change module in communication with said data collection API; and,

a gateway node module in communication with said data collection API;

wherein one of said topology gatherer module, topology change module and gateway node module provides the network topology information requested by the client to said data collection API, said data collection API providing the network topology information to the client.

2. The network element of claim 1 wherein said topology gatherer module obtains channel connection trail data identifying network connections for a channel along the optical communications network.

3. The network element of claim 2 wherein said channel connection trail data includes a network element address and a network element port identifier for network elements carrying the channel.

4. The network element of claim 2 wherein said topology gatherer module generates a request object and forwards the request object to a terminating network element to obtain the channel connection trail data.

5. The network element of claim 4 wherein said topology gatherer module receives a response object initiated at the terminating network element, the response object including the channel connection trail data.

6. The network element of claim 1 wherein said topology gatherer module obtains channel end-to-end connection data for a channel on the optical communications network.

7. The network element of claim 6 wherein the channel end-to-end connection data includes an address of an originating network element where the channel originates and a port identifier indicating the network element where the channel originates.

8. The network element of claim 6 wherein the channel end-to-end connection data includes an address of a terminating network element where the channel terminates and a port identifier indicating the network element where the channel terminates.

9. The network element of claim 1 wherein said topology gatherer module obtains client mapping data for a channel on the optical communications network.

10. The network element of claim 9 wherein the client mapping data includes an address of a client carrying the channel and a port identifier indicating the client port carrying the channel, the client being coupled to the network element where the channel originates on the optical communications network.

11. The network element of claim 9 wherein the client mapping data includes an address of a client carrying the channel and a port identifier indicating the client port carrying the channel, the client being coupled to the network element where the channel terminates on the optical communications network.

12. The network element of claim 1 wherein said topology change module obtains topology change information based on a channel entry in a multispans database associated with the optical communications network.

13. The network element of claim 12 wherein the topology change information includes addition of a channel.

14. The network element of claim 12 wherein the topology change information includes a channel becoming incomplete.

15. The network element of claim 12 wherein the topology change information includes a channel becoming stale.

16. The network element of claim 12 wherein the topology change information includes deletion of a channel.

17. The network element of claim 1 wherein said gateway node module obtains a gateway node object identifying a network element where a channel originates or terminates on the optical communications network.

18. The network element of claim 17 wherein the gateway node object includes an address of a network element where the channel originates and a port identifier indicating the

network element port where the channel originates.

19. The network element of claim 17 wherein the gateway node object includes an address of a network element where the channel terminates and a port identifier indicating the network element port where the channel terminates.

20. The network element of claim 17 wherein the gateway node object includes a hop count identifying a distance to the originating network element.

21. The network element of claim 1 wherein said data collection API generates autonomous messages to clients upon said topology change module detecting a change in the network topology information.

22. A method of collecting optical communications network topology, the method comprising:

receiving a request for network topology information from a client at a data collection application program interface (API);

generating a command to one of a topology gatherer module, a topology change module, and a gateway node module for the network topology information; and

providing the network topology information to data collection API;

the data collection API providing the network topology information to the client.

23. The method of claim 22 wherein the topology gatherer module obtains channel connection trail data identifying network connections for a channel along the optical

communications network.

24. The method of claim 23 wherein the channel connection trail data includes a network element address and a network element port identifier for network elements carrying the channel.

25. The method of claim 23 wherein the topology gatherer module generates a request object and forwards the request object to a terminating network element to obtain the channel connection trail data.

26. The method of claim 25 wherein the topology gatherer module receives a response object initiated at the terminating network element, the response object including the channel connection trail data.

27. The method of claim 22 wherein the topology gatherer module obtains channel end-to-end connection data for a channel on the optical communications network.

28. The method of claim 27 wherein the channel end-to-end connection data includes an address of an network element where the channel originates and a port identifier indicating the network element port where the channel originates.

29. The method of claim 27 wherein the channel end-to-end connection data includes an address of a network element where the channel terminates and a port identifier indicating the network element port where the channel terminates.

30. The method of claim 22 wherein the topology gatherer module obtains client mapping data for a channel on the optical communications network.

31. The method of claim 30 wherein the client mapping data includes an address of a client carrying the channel and a port identifier indicating the client port carrying the channel, the client being coupled to a network element where the channel originates on the optical communications network.

32. The method of claim 30 wherein the client mapping data includes an address of a client carrying the channel and a port identifier indicating the client port carrying the channel, the client being coupled to a network element where the channel terminates on the optical communications network.

33. The method of claim 22 wherein the topology change module obtains topology change information based on a channel entry in a multispan database associated with the optical communications network.

34. The method of claim 33 wherein the topology change information includes addition of a channel.

35. The method of claim 33 wherein the topology change information includes an incomplete channel.

36. The method of claim 33 wherein the topology change information includes a stale channel.

37. The method of claim 33 wherein the topology change information includes deletion of a channel.

38. The method of claim 22 wherein the gateway node module obtains a gateway node

object identifying a network element where a channel originates or terminates on the optical communications network.

39. The method of claim 38 wherein the gateway node object includes an address of a network element where the channel originates and a port identifier indicating the network element port where the channel originates.

40. The method of claim 38 wherein the gateway node object includes an address of a network element where the channel terminates and a port identifier indicating the network element port where the channel terminates.

41. The method of claim 38 wherein the gateway node object includes a hop count identifying a distance to the originating network element.

42. The method of claim 22 further comprising the data collection API generating autonomous messages to clients upon the topology change module detecting a change in the network topology information.